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United States
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Porcine Reproductive and Respiratory Syndrome (PRRS)

National Animal Health Monitoring System

During the late 1980's, a new disease appeared to be spreading rapidly through swine herds in the United States and Europe. The disease was characterized by late-term abortions, stillbirths, piglets born weak, and respiratory signs in pigs of all ages. Production losses from the disease were severe.

In the United States, this disease was referred to as "swine mystery disease" or Swine Infertility and Respiratory Syndrome (SIRS.) In Europe, the disease was called the Porcine Epidemic Abortion and Respiratory Syndrome (PEARS), while in the United Kingdom, it was commonly called "blue ear." Internationally, it has been generally agreed to refer to the disease as Porcine Reproductive and Respiratory Syndrome (PRRS), a name which most accurately describes its features.

The reason for the sudden upsurge of this devastating syndrome was not immediately known. Encephalomyocarditis virus, porcine parvovirus, swine influenza virus, *Leptospira bratislava*, *Chlamydia* spp., and the mycotoxin, fumonisin, were all considered possible causes. In 1991, the causative virus was isolated in the Netherlands, Germany, and the United States. Several strains of the PRRS virus have been described in the U.S., and the virus is recognized as one that is constantly evolving.

Outbreaks in the U.S. appeared to be common from 1987 through 1990 and then subsided considerably. A 1990 prevalence study of PRRS in the United States by the USDA's National Animal Health Monitoring System (NAHMS) indicated that 36 percent of the herds carried antibodies to the PRRS virus. This rather high herd prevalence suggests a common infection without observed signs of illness may have occurred with natural immunity developing. In 1994, veterinary practitioners reported an increase in the number of new cases being diagnosed. This increase may have been the result of a diminishing herd immunity and a return to naive herd population.

Signs of PRRS

Although clinical observations will vary somewhat from farm to farm, pigs with acute cases of PRRS will develop many of the following signs:

- Off-feed: Sows and finishing pigs are often the first to be affected. The anorexia is only temporary, lasting 4 to 7 days.
- Fever: slight to high.
- Reproductive failure: Consists of abortions, stillbirths, mummified fetuses, and piglets born weak that die within the first few days. An acute case of PRRS can cause devastating losses at farrowing. Averages of one pig weaned per litter are often reported.
- Respiratory problems: Neonatal and nursery pigs exhibit rapid, difficult breathing.

Affected herds may experience decreased growth performance and increased problems in other areas such as diarrheas, rhinitis, pneumonias, and bacterial infections.

Diagnosis

In acute cases, PRRS is often diagnosed only through observation of the above signs. Confirmation of the diagnosis can be made by isolating the virus from tissues or the serum of infected animals. Serum from several nursery pigs can be pooled for virus isolation. If the virus is in the bloodstream of one of the pigs, the diagnostic laboratory can isolate the virus. This test is more expensive than the serological tests described below.

Serology - detection of antibodies to the disease in the animal's bloodstream - indicates whether the animal has ever been exposed. Currently, four serologic tests are available including the indirect-fluorescent antibody (IFA), immunoperoxidase monolayer assay (IPMA), serum neutralization (SN), and the enzyme-linked immunosorbent assay (ELISA). The ELISA test is most commonly used in the United States.

Interpretation of the serological tests needs to be made by a veterinarian familiar with PRRS and the test. A positive serological test can mean the animal has been exposed to the PRRS virus or that a piglet is nursing a positive sow. Vaccinated animals will also show positive results. There is no test to differentiate

between vaccinated and unvaccinated animals as there is with pseudorabies serological testing. Knowledge of the animal's vaccination history is necessary to help determine the significance of positive test results.

The ELISA test is highly sensitive and will detect antibodies as early as 9 days after initial infection. However, the ELISA antibodies are estimated to last only 5 to 6 months which could create a problem in herds that had been exposed to the virus more than 6 months previously. If only these animals are tested, a negative test could result, but *the virus could still be residing in the herd*. Negative ELISA tests of sows can create a false sense of security, since younger animals may be infected or animals that tested negative may start shedding the virus when severely stressed. Several animals from different age groups should be tested to get a reliable picture of PRRS status of the herd. This is a vital step in initiating a PRRS diagnostic and control program.

Control

Once acute PRRS has been diagnosed on the farm, little can be done to change the clinical course of the disease. Specific treatment programs are ineffective. Supportive therapy, age segregation, or better yet, all-in, all-out management, are the best procedures to minimize PRRS-related health problems.

Usually the reproductive failure sequence lasts 2 to 4 months, and the sows develop an immunity to the disease. The degree and length of protection is not known.

Respiratory problems subside after 1 to 4 months, but susceptible nursery pigs can continue to become infected from older pigs indefinitely in continuous-flow nurseries and grower-finisher facilities. Postweaning problems often begin to develop involving *Streptococcus suis*, *Haemophilus parasuis*, *Actinobacillus pleuropneumoniae*, *Pasteurella multocida*, *Salmonella choleraesuis*, and *Mycoplasma hyopneumoniae*. Not all these diseases cause observable problems, and of those that do, usually one or two will predominate. As a result of these concurrent infections, nursery and grower-finisher pigs do poorly, and an increased death rate is common.

Most deaths in growing pigs are related to secondary infections, therefore control of secondary infections is recommended to minimize losses.

PRRS has been eradicated from farms by nursery depopulation and adding only clean pigs to the cleaned, disinfected nursery. This practice is effective only when the virus is no longer active in the breeding herd.

Control of PRRS at the farm level is a difficult and complex task. Common control strategies include nursery depopulation and vaccination, however specific plans should be developed for each farm. Control of PRRS involves an adequate understanding of farm-specific transmission patterns. The herd veterinarian can then employ appropriate strategies to manage pig-flow and herd immunity.

Prevention

Proper isolation and testing of incoming animals will help to prevent bringing the virus into the operation. However, many seedstock companies routinely vaccinate animals prior to sale, which will negate a post-arrival test.

There are still many unanswered questions regarding the Porcine Reproductive and Respiratory Syndrome. It is anticipated that world-wide research will provide us with many of the answers to this economically important disease in the future.

For additional information consult the following articles:

- Update on porcine reproductive and respiratory syndrome (PRRS). T. Blaha, et al. Swine Health and Production 3, 6:263-266. (1995)
- PRRS serology: A critical component of the diagnostic workup. S. Dee, et al. Swine Health and Production 4, 2:100-101. (1996)
- Control of PRRS in the U.S.: A systems approach. By Scott Dee and Han Soo Joo in the proceedings of The 37th George A. Young Swine Conference, August 5-6, 1996.
- The March and April 1994 issue of the American Association of Swine Practitioners' Swine Health and Production (Vol. 2, No. 2) contains a comprehensive review of PRRS in the U.S. and worldwide. Drs. W.T. Christianson and H. Joo review the literature regarding PRRS.

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